CLAIMS

What is claimed is:

1   1.   A method of backing up a file, comprising:

2   (a) making a change to an original version of a file thereby creating a new version of the

3   file;

4   (b) saving said new version;

5   (c) computing a transformation operator which is indicative of the differences between the

6   original version of the file and the new version; and

7   (d) saving said transformation operator.

1   2.   The method of claim 1 wherein (d) includes saving said transformation operator in a

2   separate file.

1   3.   The method of claim 2 wherein said separate file containing said transformation operator is

2   stored on a storage medium that also contains said new file version.

1   4.   The method of claim 3 wherein said storage medium comprises a RAID storage subsystem.

1   5.   The method of claim 1 wherein said transformation operator includes a difference value,

2   said difference value being the difference between a numerical value in the original file version

3   and a numerical value in the new file version.

1   6.   The method of claim 1 wherein said transformation operator includes words or binary

2   encoded values that have been deleted from the original file version to produce the new file

3   version.

1   7.   The method of claim 6 wherein said transformation operator also includes words or binary

2   encoded values that are present in the new file version but are not present in the original file

3   version.

1   8.   The method of claim 1 further including making a further change to said new file version to

2   create a second new file version, saving said second new file version, computing a second

3   transformation operator which is indicative of the differences between the new file version and the

4   second new file version, and saving said second transformation operator.

1   9.   The method of claim 1 further including making a further change to said new file version to

2   create a second new file version, saving said second new file version, computing a second

3   transformation operator which is indicative of the differences between the original file version and

4   the second new file version, and saving said second transformation operator.

1   10.   A method of recovering an original version of a file that has been overwritten by a new

2   version of the file, comprising:

3   (a) retrieving a transformation operator which is indicative of the differences between the

4   original version of the file and the new file version; and

5   (b) applying said transformation operator to the new file version.

1   11.   The method of claim 10 wherein said transformation operator is stored in a separate file.

1   12.   The method of claim 11 wherein said separate file containing said transformation operator

2   is stored on a storage medium that also contains said new file version.

1   13.   The method of claim 12 wherein said storage medium comprises a RAID storage

2   subsystem.

1   14.   The method of claim 10 wherein said transformation operator includes a difference value,

2   said difference value being the difference between a numerical value in the original file version

3   and a numerical value in the new file version.

1   15.   The method of claim 10 wherein said transformation operator includes words or binary

2   encoded values that have been deleted from the original file version to produce the new file

3   version.

1   16.   The method of claim 15 wherein said transformation operator also includes words or binary

2   encoded values that are present in the new file version but are not present in the original file

3   version.

1   17.   A computer system, comprising:

2   a processor;

3   an input device coupled to said processor; and

4   a non-volatile a storage device coupled to said processor, said storage device containing

5   files and containing a transformation operator which is indicative of the differences

6   between a first version of a file and a second version of the file.

1   18.   The computer system of claim 17 wherein said transformation operator is stored in a file

2   that is separate from the file containing the second version.

1   19.   The computer system of claim 17 wherein said storage device comprises a RAID storage

2   subsystem.

1   20.   The computer system of claim 17 wherein said transformation operator includes a

2   difference value, said difference value being the difference between a numerical value in the first

3   file version and a numerical value in the second file version.

1   21.   The computer system of claim 17 wherein said transformation operator includes words or

2   binary encoded values that have been deleted from the first file version to produce the second file

3   version.

1   22.   The computer system of claim 21 wherein said transformation operator also includes words

2   or binary encoded values that are present in the first file version but are not present in the second

3   file version.

1   23.   The computer system of claim 17 wherein said second file version has been changed

2   further into a third file version, and said storage device also contains a second transformation

3   operator which is indicative of the differences between the second file version and the third file

4   version.

1   24.   The computer system of claim 17 wherein said second file version has been changed

2   further into a third file version, and said storage device also contains a second transformation

3   operator which is indicative of the differences between the first file version and the third file

4   version.

1   25.   A computer system, comprising:

2   a processor; and

3   a non-volatile a storage device coupled to said processor, said storage device containing

4   files, one of said files being a third version and having two prior sequential

5   versions, the earliest version being a first version and a latter version being a second

6   version, and said storage device contains a first transformation operator which is

7   indicative of the differences between the first version and the third version and said

8   storage device contains a second transformation operator which is indicative of the

9   differences between the second version and the third version.

1   26.   The computer system of claim 25 wherein said storage device comprises a RAID storage

2   subsystem.

1   27.   The computer system of claim 25 wherein said transformation operators include a

2   difference value, said difference value being the difference between a numerical value in one file

3   version and a numerical value in another file version.

1   28.   The computer system of claim 25 wherein said transformation operators include words or

2   binary encoded values that have been deleted from one file version to produce another file version.

1   29.   The computer system of claim 28 wherein said transformation operators also include words

2   or binary encoded values that are present in one file version but are not present in another file

3   version.